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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,948	01/29/2004	Azat M. Latypov	1857.2190000	1856

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EXAMINER	
RASHID, DAVID	

ART UNIT	PAPER NUMBER
2624	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/765,948	LATYPOV ET AL.	
	Examiner	Art Unit	
	DAVID P. RASHID	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 July 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-7,9,10,13,15 and 18-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-7,9,10,13,15 and 18-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

[1] All of the examiner's suggestions presented herein below have been assumed for examination purposes, unless otherwise noted.

Continued Examination Under 37 CFR 1.114

[2] A request for continued examination under 37 CFR § 1.114, including the fee set forth in 37 CFR § 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR § 1.114, and the fee set forth in 37 CFR § 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR § 1.114. Applicant's submission filed on July 16, 2008 has been entered.

Amendments

[3] This office action is responsive to the Amendment and Remarks received on July 16, 2008. Claims 1-3, 5-7, 9-10, 13, 15, and 18-24 remain pending.

Response to Arguments

[4] Amendment and Remarks filed July 16, 2008 with respect to claims 1-3, 5-7, 9-10, 13, 15, and 18-24 have been respectfully and fully considered, but not found persuasive.

Summary of Remarks regarding Rejections under 35. U.S.C. § 103

> *Sandstrom*, Yonekubo, and Latta, taken alone or in combination, do not teach or suggest at least this feature of claims 1 and 24, as also discussed in the previous Reply under 37 C.F.R. §1.116 filed June 19, 2008, to which the Examiner is respectfully referred. Accordingly, Applicants respectfully request that this rejection be reconsidered and withdrawn, and that claims 1 and 24, and their respective dependent claims, be passed to allowance.

(Amendment and Remarks at 7, Jul. 16, 2008.)

> As discussed above with respect to claims 1 and 24, from which claims 10 and 18 respectively depend, *Sandstrom*, Yonekubo and Latta fail to teach "using a semi-plane knife-edge to block, on17 from one side at a time, a zero order lobe of a pixel diffraction pattern at the apodized pupil." Evans likewise fails to teach this feature. In the Office Action at page 9, the Examiner states, which Applicants do not acquiesce to, Evans teaches a method for fabricating an annular mask having diffraction-reducing edges that forms an apodized pupil using an algorithm derived

> apodization pattern, such that variations are present in at least one &transmittance and phase. Thus, Evans is not used to teach or suggest the above-recited feature of claims 1 and 24, nor does Evans teach or suggest this feature. Because claims 10 and 18 include all features of claims 1 and 24, claims 10 and 18 necessarily include this feature.

(Amendment and Remarks at 8.)

> As discussed above with respect to claims 1 and 24, from which claims 22 and 23 respectively depend, *Sandstrom*, Yonekubo and Latta fail to teach "using a semi-plane knife-edge to block, only from one side at a time, a zero order lobe of a pixel diffraction pattern at the apodized pupil." Pedersen likewise fails to teach this feature. In the Office Action at page 9, the Examiner states, which Applicants do not acquiesce to, Pedersen teaches a method for determining the coordinates of an object. Thus, Pedersen is not used to teach or suggest the above-recited feature of claims 1 and 24, nor does Pedersen teach or suggest this feature. Because claims 22 and 23 include all features of claims 1 and 24, claims 22 and 23 necessarily include this feature. Given that none of the applied references teach this feature, claims 22 and 23 are not obvious in view of *Sandstrom*, Yonekubo, Latta and Pedersen.

(Amendment and Remarks at 9.)

Examiner's Response

Applicant's arguments with respect to claims 1-3, 5-7, 9-10, 13, 15, and 18-24 have been considered but are moot in view of the new grounds of rejection.

Claim Rejections-35 USC § 103

[5] The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

[6] **Claims 1-3, 5-7, 9, 13, 15, 19-21** and **24** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,399,261 (issued Jun. 4, 2002, hereinafter "Sandstrom") in view of U.S. Patent No. 5,610,897 (issued Mar. 11, 1997, hereinafter "Yamamoto et al.").

Regarding **claim 1**, while *Sandstrom* discloses a method (2:27-53) comprising:

applying a voltage (5:12-13; 13:30-35) having a voltage value (any applied voltage has a "voltage value") to pixels (fig. 2; fig. 3; fig. 4) in a spatial light modulator (SLM) (fig. 4; 2:66-67; fig. 6, item 601) to move the pixels (fig. 4);

reflecting light from the moved pixels (fig. 4);

passing the reflected light (12:15-17) through an apodized pupil (fig. 4, items 402, 404; fig. 6, items 608, I_1, I_2) in an optical system (fig. 6, item 604);

capturing an image from the light after it passes through the apodized pupil ("CCD camera" at 13:3-7);

correlating the image and the voltage value to generate a result signal ("…series of test patterns…" at 13:27-31); and

calibrating the pixels using the result signal (13:20-34), *Sandstrom* does not teach using a semi-plane knife-edge to block from one side a zero order lobe of a pixel diffraction pattern at the apodized pupil (though *Sandstrom* suggests there exists a lobe (whether main or side is not specified) that is blocked from a pixel diffraction pattern at the apodized pupil).

Yamamoto et al. teaches using a semi-plane knife-edge (fig. 21, item 119) to block, from only one side at a time, a zero order lobe (it is inherent by fig. 21 that the semi-plane knife-edge removes all light passing through the side of the semi-plane knife-edge and thus deleting all light on that side of which would have been collected at item 120, including a zero order lobe on that side) of a diffraction pattern (e.g., fig. 45 list "diffraction patterns").

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the apodized pupil of *Sandstrom* to include blocking a portion of a zero order lobe of a pixel diffraction pattern as taught by *Yamamoto et al.* AND thus (i) the diffraction pattern of

Yamamoto et al. would then be the pixel diffraction pattern of *Sandstrom* and (ii) the semi-plane knife-edge to block of *Yamamoto et al.* would then be "at the apodized pupil" (whether close or far is irrelevant if the knife-edge is already being used to block a zero order lobe) of *Sandstrom* "to provide an optical information recording/reproduction apparatus, which allows reproduction of an information pit smaller than a light spot, and can remarkably increase the storage capacity of an information storage medium applied to this reproduction" (*Yamamoto et al.* at 2:6-11) and for "[g]enerating a focusing error signal for auto-focusing control" (*Yamamoto et al.* at 28:2-3).

Regarding **claim 2**, *Sandstrom* further comprises individually resolving each of the pixels ("…for every corresponding SLM pixel…" at lines 31-34) using the apodized pupil (fig. 4, items 402, 404; fig. 6, items 608, I_1, I_2).

Regarding **claim 3**, *Sandstrom* further comprises using a charge coupled device (CCD) to perform the capturing step ("CCD camera" at 13:3-7).

Regarding **claim 5**, *Sandstrom* discloses wherein the image of each of the pixels is captured using more than one cell in the CCD array (It is implicit if not already inherent that the image of each of the pixels is captured using more than one cell in the CCD array.).

Regarding **claim 6**, *Sandstrom* further comprises:

tilting the pixel (fig. 2; fig. 3; fig. 4) through a plurality of desired angles (7:36-38); and

performing the capturing step for each of the desired angles (those angles desired from the possible "25 levels (plus zero)" to perform the calibration as outlined in 13:20-34 are performed).

Regarding **claim 7**, *Sandstrom* further comprises:

tilting the pixel (fig. 2; fig. 3; fig. 4) through a plurality a set of angles (7:36-38); and

performing the capturing step for each angle in the set of angle (those angles in the set from the possible "25 levels (plus zero)" to perform the calibration as outlined in 13:20-34 are performed)

using interpolation to determine a voltage value that moves the pixel to an angle outside the set of angles ("interpolating" at 7:36-38).

Regarding **claim 9**, *Sandstrom* further comprises forming the apodized pupil using one of an annular (fig. 6, item 608) and a semi-circular pattern

Regarding **claim 13**, claim 3 recites identical features as in claim 13. Thus, references/arguments equivalent to those presented for claim 3 are equally applicable to claim 13.

Regarding **claim 15**, claim 5 recites identical features as in claim 15. Thus, references/arguments equivalent to those presented for claim 5 are equally applicable to claim 15.

Regarding **claim 19**, *Sandstrom* further comprises wherein:

the voltage moves each of the pixels through a plurality of desired angles (the desired angles of fig. 4; 5:8-20); and

the correlating device (the device responsible for 13:27-31) determined a first result signal for each of the desired angles.

Regarding **claim 20**, claims 7 and 19 recite identical features as in claim 20. Thus, references/arguments equivalent to those presented for claims 7 and 19 are equally applicable to claim 20.

Regarding **claim 21**, *Sandstrom* further comprises using projection optics of a lithography tool ("The present invention relates to printing of patterns…" at 1:10-12) as the optical system (fig. 6, item 604).

Regarding **claim 24**, while *Sandstrom* discloses a system (2:27-53) comprising:

a voltage value storage (5:12-13; 13:30-35) having a voltage value (any applied voltage has a "voltage value") to pixels (fig. 2; fig. 3; fig. 4) in a spatial light modulator (SLM) (fig. 4; 2:66-67; fig. 6, item 601) to move the pixels (fig. 4);

a device (fig. 4A, items 402, 404) configured to apodize a pupil (fig. 6, item 608) in an optical system;

a detector ((("CCD camera" at 13:3-7)) configured to capture an image from light that has reflected off the SLM (fig. 4A, item 401) and passed through the device;

a correlating device (the device responsible for 13:27-31) configured to correlate the image and the voltage value to generate a result signal ("…series of test patterns…" at 13:27-31); and

a controller configured to calibrate the pixels using the result signal (13:20-34), *Sandstrom* does not teach using a semi-plane knife-edge to block from one side a zero order lobe of a pixel diffraction pattern at the apodized pupil (though *Sandstrom* suggests there exists a lobe (whether main or side is not specified) that is blocked from a pixel diffraction pattern at the apodized pupil).

Yamamoto et al. teaches using a semi-plane knife-edge (fig. 21, item 119) to block, from only one side at a time, a zero order lobe (it is inherent by fig. 21 that the semi-plane knife-edge removes all light passing through the side of the semi-plane knife-edge and thus deleting all light

on that side of which would have been collected at item 120, including a zero order lobe on that side) of a diffraction pattern (e.g., fig. 45 list "diffraction patterns").

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the apodized pupil of *Sandstrom* to include blocking a portion of a zero order lobe of a pixel diffraction pattern as taught by *Yamamoto et al.* AND thus (i) the diffraction pattern of *Yamamoto et al.* would then be the pixel diffraction pattern of *Sandstrom* and (ii) the semi-plane knife-edge to block of *Yamamoto et al.* would then be "at the apodized pupil" (whether close or far is irrelevant if the knife-edge is already being used to block a zero order lobe) of *Sandstrom* "to provide an optical information recording/reproduction apparatus, which allows reproduction of an information pit smaller than a light spot, and can remarkably increase the storage capacity of an information storage medium applied to this reproduction" (*Yamamoto et al.* at 2:6-11) and for "[g]enerating a focusing error signal for auto-focusing control" (*Yamamoto et al.* at 28:2-3).

[7] **Claims 10** and **18** are rejected under 35 U.S.C. 103(a) as being unpatentable over *Sandstrom* in view of *Yamamoto et al.* and U.S. Patent No. 5,965,330 (issued Oct. 12, 1999; hereinafter "Evans et al.").

Regarding **claim 10**, while *Sandstrom* in view of *Yamamoto et al.* discloses the method of claim 1, *Sandstrom* in view of *Yamamoto et al.* does not teach further comprising forming the apodized pupil using one of a semi-plane, a shearing grating, and an algorithm derived apodization pattern, such that variations are present in at least one of transmittance and phase.

Evans et al. discloses a method for fabricating annular mask lens having diffraction-reducing edges (fig. 13) that teaches forms an apodized pupil using one of an algorithm derived

apodization pattern (13:33-56), such that variations are present in at least one of transmittance (13:33-56) and phase.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the annular apodized pupil of *Sandstrom* in view of *Yamamoto et al.* to include forming the annular apodized pupil using an algorithm derived apodization pattern, such that variations are present in at least one of transmittance and phase as taught by *Evans et al.* because "[t]he improved mask eliminates the "halo effect" associated with conventional annular masks. . ." (*Evans et al.*, 2:25-30).

Regarding **claim 18**, claim 10 recites identical features as in claim 18. Thus, references/arguments equivalent to those presented for claim 10 are equally applicable to claim 18.

[8] **Claims 22-23** are rejected under 35 U.S.C. 103(a) as being unpatentable over *Sandstrom* in view of *Yamamoto et al.* and U.S. Patent No. 6,369,879 (issued Apr. 9, 2002, hereinafter "Pedersen").

Regarding **claim 22**, while *Sandstrom* in view of *Yamamoto et al.* disclose the method of claim 1, *Sandstrom* in view of *Yamamoto et al.* do not teach wherein the image of each of the pixels is captured using one cell in a CCD array.

Pedersen discloses a method for determining the coordinates of an object (fig. 2) that include wherein the image (fig. 2, item 16) of each of the pixels ("one to one" at 4, line 59-5, line 8) is captured using one cell in the CCD array (fig. 2, item 26).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the CCD array and image of each of the pixels of *Sandstrom* in view of *Yamamoto*

et al. to include wherein the image of each of the pixels is captured using one cell in the CCD array as taught by *Pedersen* so that "each LCD pixel is uniquely identified with a number", (*Pedersen* at 5:9-10) and in "detecting at known detector pixel locations the intensity sequence of reflected illumination from the surface of the object whereby the identity and location of the originating illuminated pixel can be determined" (*Pedersen* at 2:59-62).

Regarding **claim 23**, claim 22 recites identical features as in claim 23. Thus, references/arguments equivalent to those presented for claim 22 are equally applicable to claim 23.

Conclusion

[9] Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID P. RASHID whose telephone number is (571)270-1578. The examiner can normally be reached Monday-Friday 7:30-17:00 ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on (571) 272-74155. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David P. Rashid/
Examiner, Art Unit 2624

David P Rashid
Examiner
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Supervisory Patent Examiner, Art Unit 2624